Bishop Auckland Bus Station and Car Park

LIGHTING STATEMENT

BL000034-JAC-XX-XX-RP-E-00001 | P01

22/12/22

Bishop Auckland Bus Station and Car Park

Project No:	BL000034
Document Title:	LIGHTING STATEMENT
Document No.:	BL000034-JAC-XX-XX-RP-E-00001
Revision:	P01
Document Status:	Suitable for Stage approval
Date:	22/12/22
Client Name:	Durham County Council
Client No:	N/A
Project Manager:	Dominic Brown
Author:	T Paradise-Hirst
File Name:	BL000034-JAC-XX-XX-RP-E-00001

Jacobs
2nd Floor Cottons Centre
Cottons Lane
London SE1 2QG
England
Phone: +44 (0)203 980 2000
www.jacobs.com

Document history and status

Revision	Date	Description	Author	Checked	Reviewed	Approved
P01	22/12/22	ISSUED FOR PLANNING APPLICATION	AR/CS	TPH	HM	DB

Contents

Executive Summary

All new developments require careful consideration with regard to lighting.

This document provides a detailed overview of the proposed development and associated lighting design.

The Bishop Auckland Bus Station and associated redeveloped Car Park will be a catalyst to new development and will be a focus of the wider regeneration projects in the region.

Effective transport is the hub and connectivity that helps a community and visitors participate in the town. This in turn and will animate the space. A hive of activity coupled with a new bus station hub will give and a sense of purpose and a feeling of safety though increased footfall and self-policing.

Lighting is often a concern in planning as it needs to be considered, sensitive and appropriate to the location and application. This document provides the background and design intent, with a detailed narrative of the mitigations made to minimise sky-spill or adverse glare is provided.

Lighting is a specialist design element. Care and attention have been given to the design to follow best practice

The closest residential properties to the site are on Clayton Street, Saddler Street and are not high-rise buildings. From our analysis and simulations, there are no adverse lighting trespass factors that have been identified. Further, having reviewed the buildings aspect and occupancy of the windows that give visibility towards the site, the windows are generally secondary spaces being kitchens, bathrooms and secondary bedrooms. In any event no lighting fixtures that would cause direct luminous intensity glare to these residential / commercial properties are proposed.

1. Project Summary

The proposed lighting for the new Bishop Auckland Bus Station and associated Car Park has been developed to be low-glare and to provide effective / direct lighting, whilst enhancing general visibility and safety across the area.

The lighting design is focused on visitor's safety as well as providing safe lighting for vehicle movement.

This report summarises the proposed lighting and design considerations, it provides details of the intent and includes images and simulations of the proposed lighting. A detailed narrative of the mitigations made to minimise sky-spill or adverse glare is provided.

Lighting is a specialist design element. Care and attention have been given to the design to follow best practice based on UK guidance. The lighting has been specifically designed to mitigate upwards-light and stray-light, which are the two primary components which if not considered in the early design stages can potentially cause a nuisance or light trespass.

Whilst the lighting in the site location for this project is currently within a 'hot-spot' (see following references), projects like this offer the opportunity to replan the currently installed lighting to provide lower light levels and more controlled lighting. In time, projects like this can inform future developments to encourage further reduction of lighting pollution and add control where the light is directed.

The project site is in the near of two rivers and green space. It is therefore important that the lighting considers the environmental receptors and provides the qualities which are compatible with ecology and that is comfortable to the eye. The lighting should therefore operate within a spectral bandwidth which is not adverse towards bats, winter birds and other natural receptors in the near location. Equally the lighting should not cause a nuisance to nearby residential communities.

The closest residential properties to the site are on Clayton Street, Saddler Street and are not high-rise buildings. From our analysis and simulations, there are no adverse lighting trespass factors that have been identified. Further, having reviewed the buildings aspect and occupancy of the windows that give visibility towards the site, the windows are generally secondary spaces being kitchens, bathrooms and secondary bedrooms. In any event no lighting fixtures that would cause direct luminous intensity glare to these residential / commercial properties are proposed.

The works will include the removal of all existing structures, lighting and signage within the project site and introduce a new bus station / hub facility coupled with a car park /support facilities such as EV charging, low energy lighting and new landscaped features.

This project is part of a longer-term urban regeneration for the community and to support tourism and the local economy.

2. Site Location and Context

Lighting for this project is designed to respond to the local community and seek to improve lighting practice and reduce sky-spill / light pollution.

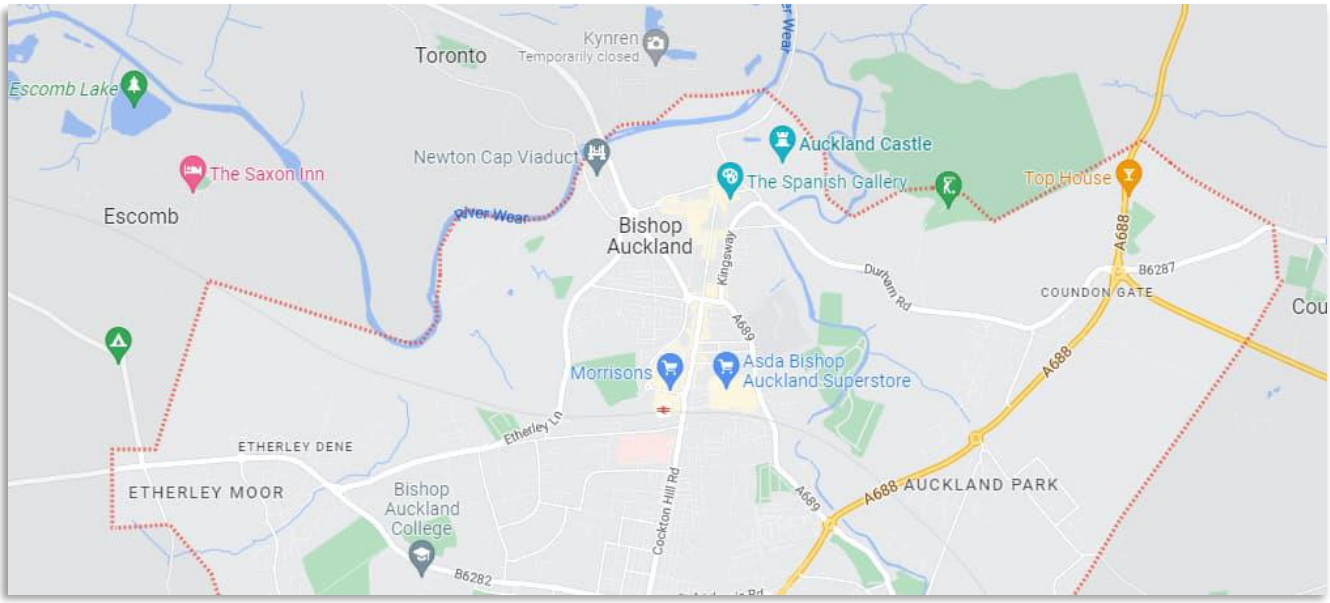

Figure 1 Site Location Map

Figure 2 Existing lighting have generic lighting optics, a number have limited control – no dimming or group dimming is employed.

Bishop Auckland is a historic market town in near of the River Wear and the River Gaunless within the County of Durham. It has a vibrant community, is a tourist attraction and has a night-time economy. Currently Bishop Auckland is identified as a town which has a night-time upward sky spill lighting component.

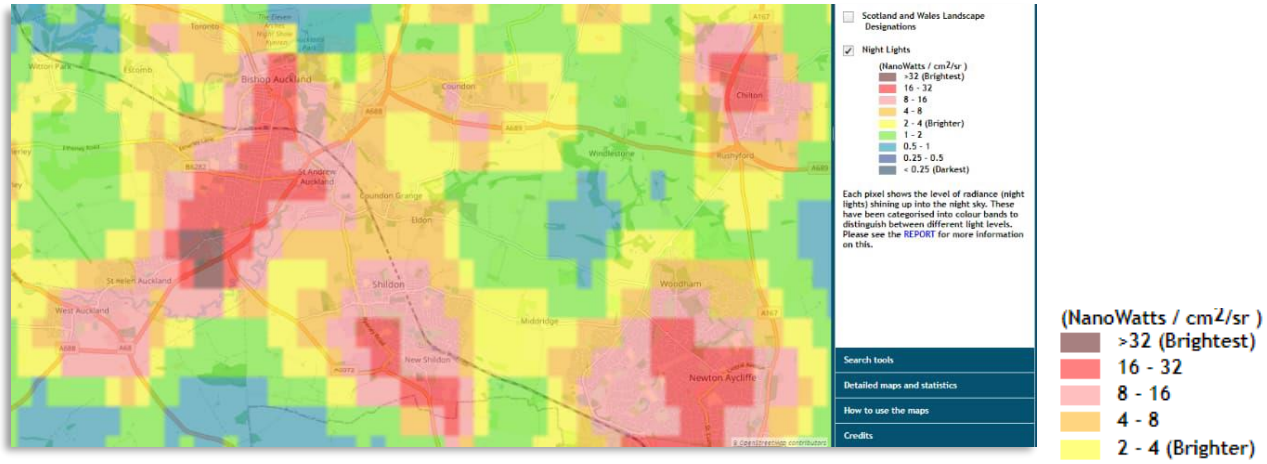

Figure 3 LUC Map

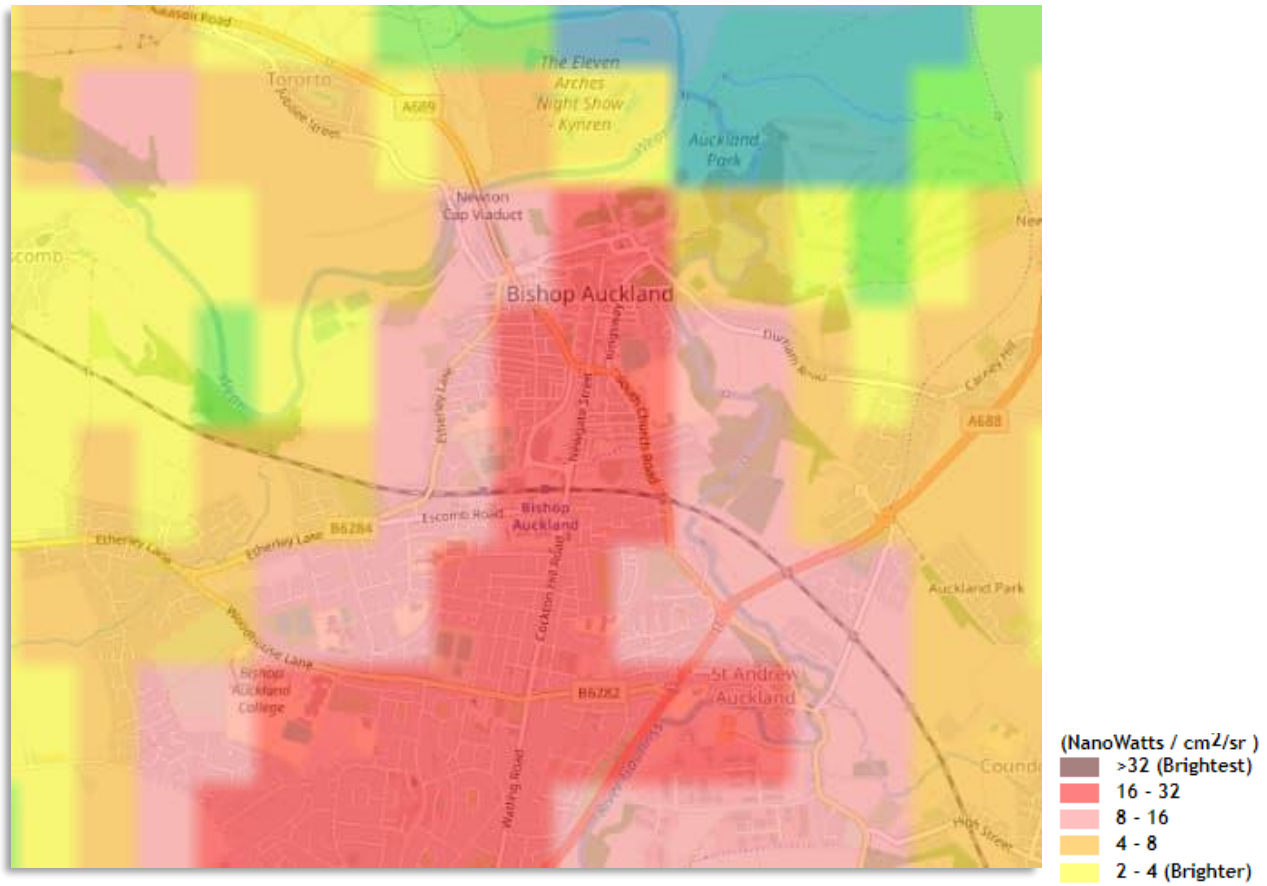

Figure 4 England's Light Pollution and Dark Skies. LUC Data – Open Source / Web 2022

The central axis of Bishop Auckland is currently within a zone of sky-spill light. A combination of over bright light sources, uncontrolled lighting, lit signage, and commercial external lighting will be the key contributors to the current night-time sky spill.

The new proposed carpark and bus station is on the northern edge of this bright zone and this project offers the opportunity to reduce upward light.

3. Project Scope and Description

The basis of the proposed installation has three elements in terms of light sources.

- Urban lighting, which comprises the external lighting to the carpark areas, the lighting to the associated walkways / pedestrian access.
- Lighting within the bus station building.
- Emergency lighting to the external entry and exit points to the building.

All lighting is designed to align with UK code, guidance documents and standard practice applicable to bus stations and car parks.

4. References / Authorities

CIBSE – SLL – Code of Lighting (Current version)

CIBSE – SLL – External lighting guide (LG6)

CIBSE – SLL – Lighting Guide 15 (LG15) – Transport Buildings

CIE 126 – Guidance for minimising sky glow (1997)

CIE – 150:2017 – Guide on the limitations of the effects of obtrusive light

CIE – 136:2000 – Guide to the lighting of urban areas

DEFRA – Towards good practice (Current edition / revisions)

ILP – Lighting (Exterior Lighting Guides)

Guidance document – GN:01

Reduction of Obtrusive light

5. Statutory Codes / Guidance

BS Standards BS 5489-1:2020 – Code of practice for the design of road lighting

BS 12464-1:2021 – Lighting of indoor workplaces

BS 12464-2:2021 – Lighting of outdoor workplaces

BS 13201-2:2015 – Code of practice for the design of road lighting

6. National Planning Policy Framework

NPPF – 2021 (GOV.UK – Policies and related references)

Adherence within the design and design approach for the bus station at Bishop Auckland is given regarding the relevant sections of the policy framework – For lighting considerations the adherence of these include:

Paragraph (124) - Daylight / Use of natural light

Paragraph (185) – Impact of light pollution

7. Target Criteria

The site being within a town-centre location is classed as an urban lighting zone. Lighting outside of a town / village centre would have lower light level recommendations.

Environmental class – Bishop Auckland: (E3) – Urban Area

Target light levels we have designed to are capable of providing light to the region of circa 10-30 Lux on target surface areas, with no-upward direct lighting components. Based on the guidance documents, we have selected a uniformity appropriate to the urban context – being circa 0.3 in primary circulation areas. The proposed lighting is dimmable and will be set to averages of 15-20lux.

The scheme has developed with lighting controls to enable dimming and a higher degree of control for the light. We have factored in lumen degradation within our design, so when the lighting is set up and installed, the lighting will be dimmed from day one, to appropriate light levels in accordance with the local context and this will afford the provision to re-balance the light levels in the future as the equipment ages, rather than replacing the lighting equipment and modules. This approach also allows the lighting to be trimmed to save energy.

Photocell-controlled lighting which is DALI-2 protocol based is interlinked, so as dusk falls and as day-breaks the lighting in groups will follow the external lighting conditions and will be programmed to dim to lower light output levels (circa 40% of the set output) between midnight and 5 AM.

The lighting is proposed to be 3000K (Kelvin) – which is a warm quality of light, inviting and considered soft in tone.

The exact programming and set levels will be determined during the commissioning stages.

8. Lighting Locations

Note the columns are either 6m or 4m

Luminaire layout plan – External lighting

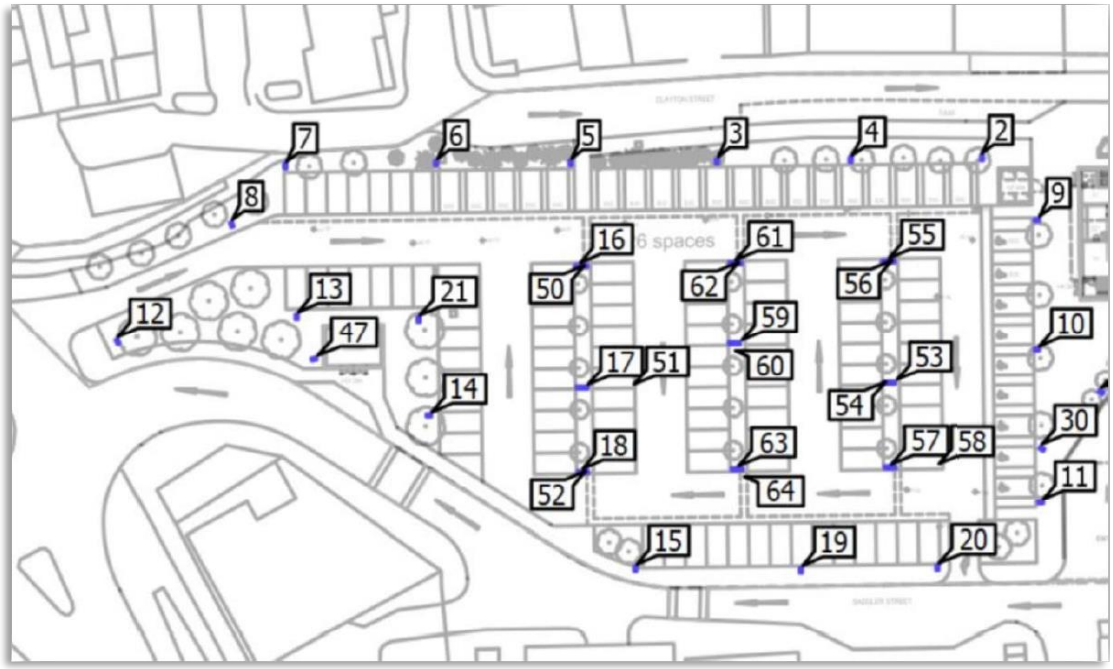

Figure 5 The lighting within the main carpark utilises double-headed fixtures to reduce visual clutter. All lighting is 'down-lighting' (i.e., direct to target surface) to mitigate sky-spill.

The numbers refer to the lighting equipment schedules.

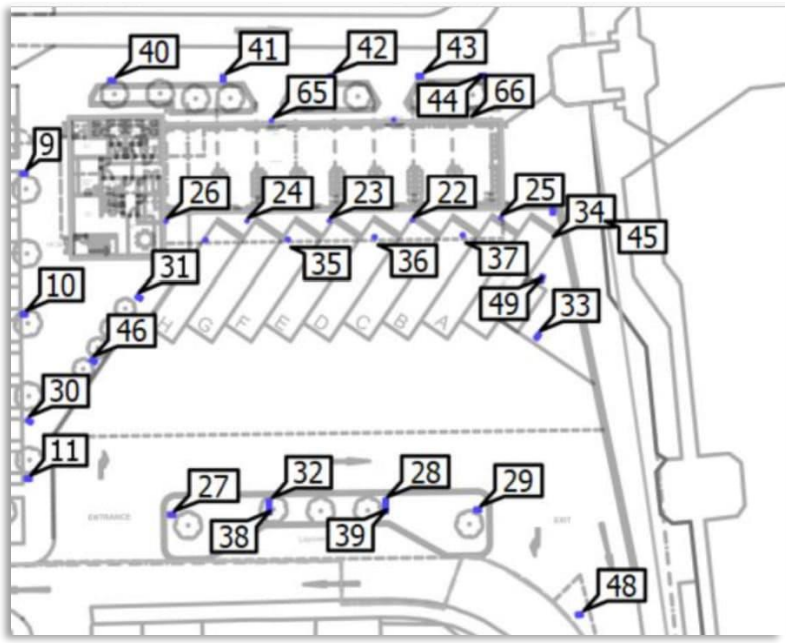

Figure 6 Note: Lighting is located under the canopy to reduce visual clutter and all lighting is down-lighting (direct to target surface) to mitigate sky-spill

9. Schedule of Luminaires

Manufacture	Reference	Wattage	Lighting controls	Lum output	Lum type	Mounting height/type	Area used	Quantity	Colour/finish	Reference code
Sill lighting – Projector 14M	AA (E*)	100 W	Dali dimming	10450 lm	Projector	6.7 m	Canopy (on edge)	4	TBC	4M3104WWDE916
Sill lighting – Projector 14S	AB (E*)	30 W	Dali dimming	4000 lm	Projector	6.3 m	Canopy (close to building)	5	TBC	14S3030WWDE916
Schreder – TECEO (THYLIA Pole)	BA	66.5 W	Dali dimming	6847 lm	Pole	6m Pole	-Car Park -Layover bay 2 -Layover, entrance & exit	52	TBC	TECEO GEN2 | 2
Schreder – TECEO (THYLIA Pole)	BB	66.5 W	Dali dimming	6847lm	Pole	4m Pole	Bus station exterior	8	TBC	TECEO GEN2 | 2

Figure 7 A number of double headed units are used to reduce lighting columns.

10. Images of Proposed Lighting Fixtures and Photometry

1) Downlighters located within the canopy at the bus station.

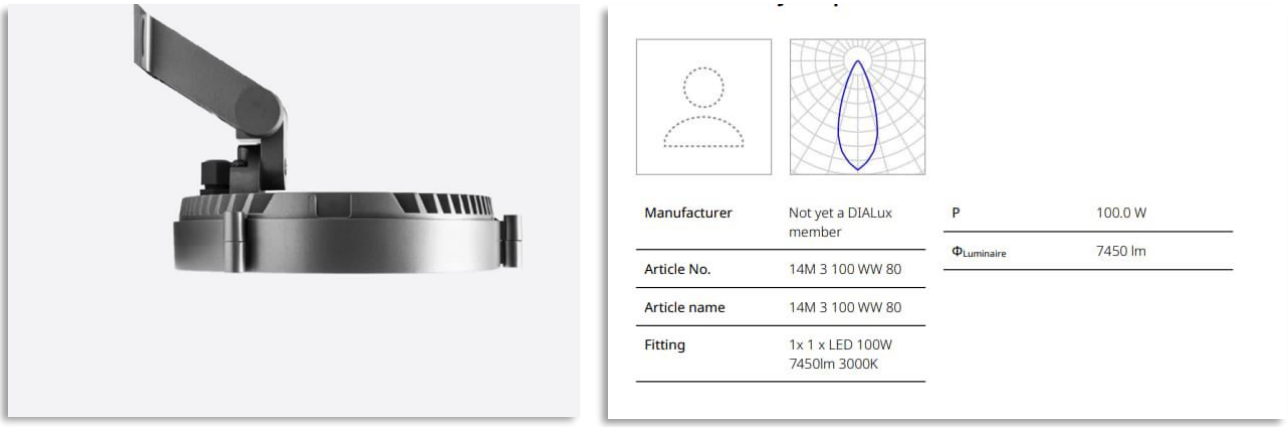

Figure 8 LED Based lighting – DALI 2 dimmable

Slim External Projector (Sill lighting). Note – all lighting is 'down-lighting' these fixtures are to be located within the bus station external canopy to provide functional light for visitors entering or exiting the buses / coaches parked at the bus station.

2) Single head

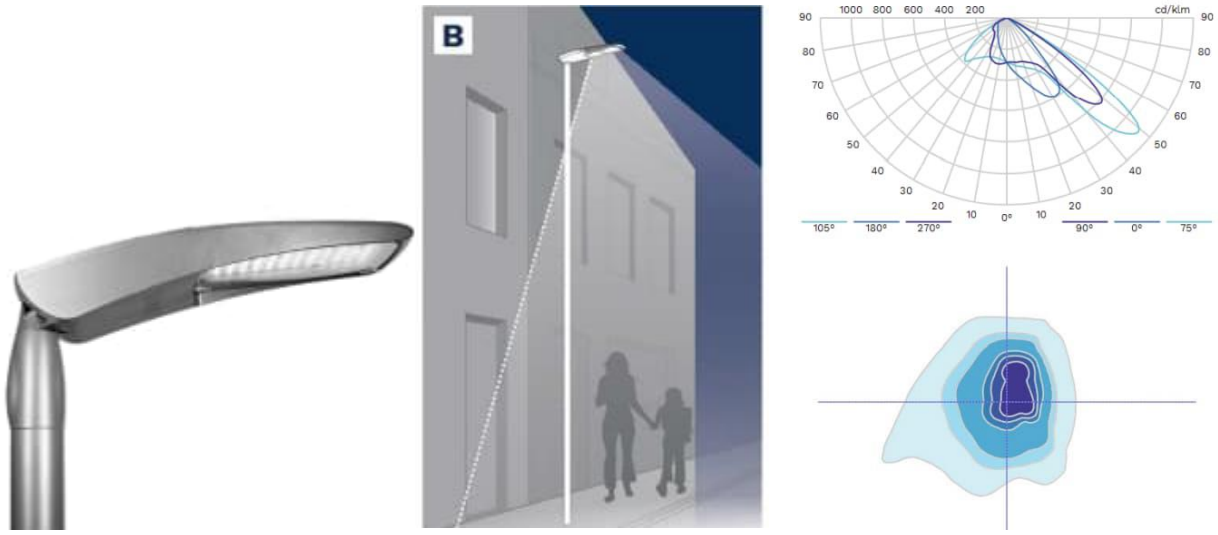

Figure 9 Shows typical effective 'lighting cut off' to mitigate light trespass, example photometry shows level of control and optical distribution – note: several optical types are applied to the design to achieve the uniformity and required light levels.

3) Double head

Figure 10 Examples of the lighting columns and heads – these align with some of the newer lighting installations within the town.

11. Assessment Methodology

A site-specific lighting model has been constructed, this factors in local features, building heights and the context. Lighting simulations have been made with the proposed lighting fixtures set at full output. As the location of fixtures are contained within the site boundary and all lighting is focused to the target surfaces (with flat-glass optics), there is no direct risk of glare, lighting discomfort or sky-spill.

A visual site-specific assessment has been developed to review the context, building type occupancy and site attributes. There were no adverse lighting trespass or glare risks found, based on the current building usage and proximities.

We have suggested that fixtures to the edge of the site can be further controlled with antiglare shields to control any minimal backlight if ever requested.

12. Data Sources

For this stage of the design, we have selected typical lighting fixtures from the UK market / supply chain, with the optics and glare control required to achieve the required performance and quality of light. All of the proposed light fixtures are as documented within the lighting model and used within our simulation.

13. Luminaire Lighting Simulations and Results (Full Site Extends)

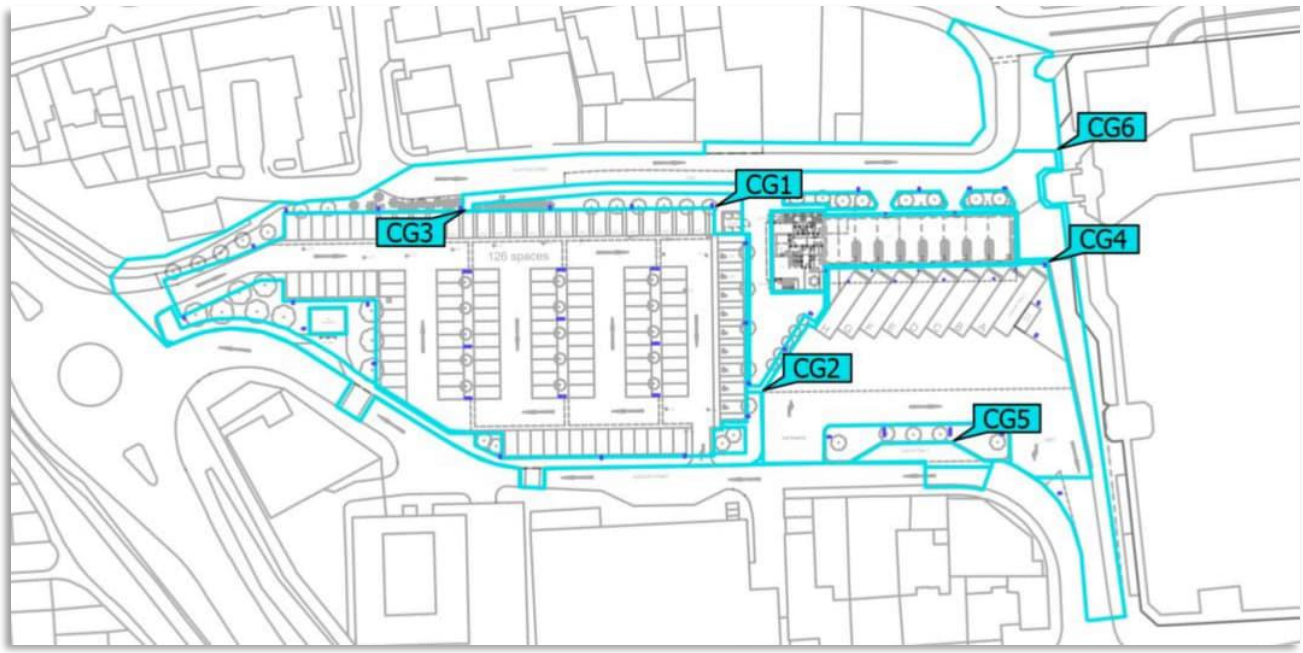

Figure 11 Calculation areas are defined to assess – the resulting light levels (note as all luminaires) are located as down-lighting, there is no sky-spill or upwards component of light to cause lighting pollution.

14. Summary of Calculation Surfaces Examined within the Site

Calculation surfaces

Properties	$\bar{E}$	E_{min}	E_{max}	g_1	g_2	Index
Car Park Perpendicular illuminance Height: 0.000 m	33.4 lx	13.1 lx	55.3 lx	0.39	0.24	CG1
Walkway & HV substation Perpendicular illuminance Height: 0.000 m	16.9 lx	1.94 lx	40.4 lx	0.11	0.048	CG2
Walkway Perpendicular illuminance Height: 0.000 m	22.0 lx	7.37 lx	52.5 lx	0.34	0.14	CG3
Layover, enterance & exit Perpendicular illuminance Height: 0.000 m	24.3 lx	6.70 lx	71.8 lx	0.28	0.093	CG4
Layover Bay 2 Perpendicular illuminance Height: 0.000 m	30.4 lx	16.2 lx	45.7 lx	0.53	0.35	CG5
Bus Station Exterior Perpendicular illuminance Height: 0.000 m	26.1 lx	7.14 lx	50.3 lx	0.27	0.14	CG6

Figure 12 Note all areas are assessed and are calculated with maximum outputs modelled. The lighting will be dimmed to achieve compliance with the lighting codes and set to levels appropriate to the context and operational functions.

15. Composite Site Simulation – Resulting Light

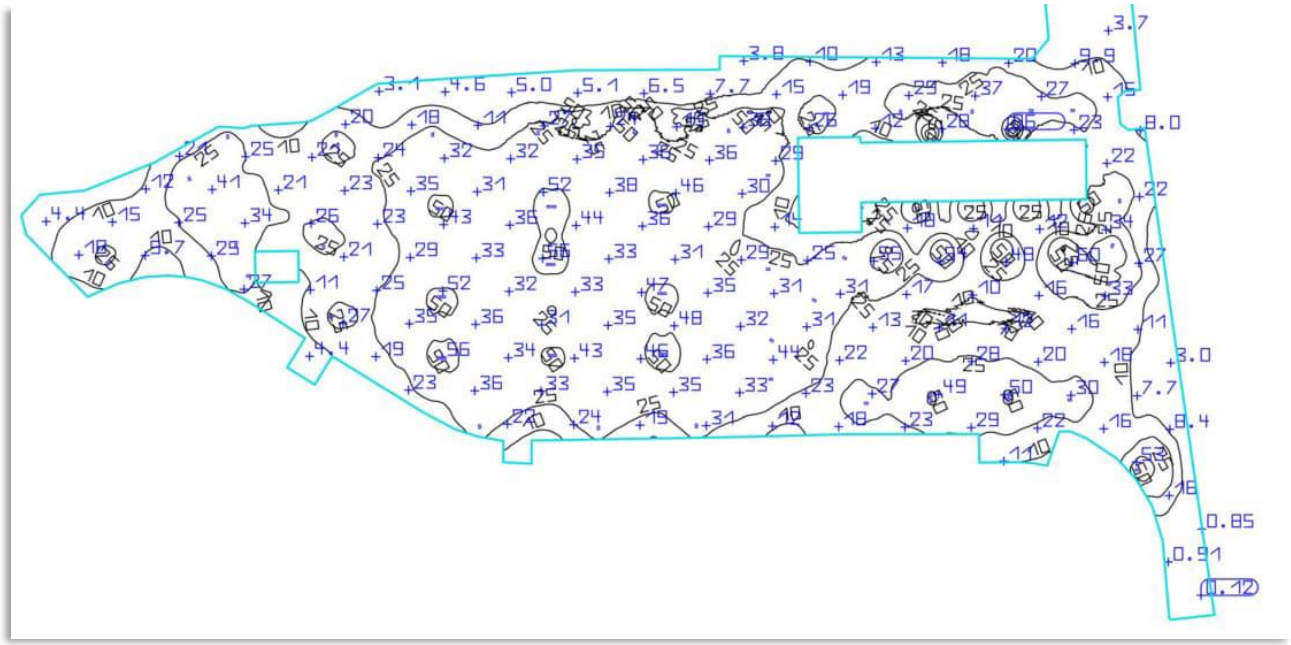

Figure 13 Light levels are shown in LUX values, with maximum levels simulated – it is noted that as the lighting design is specific to the target surfaces only, minimal secondary light is received at points at the site boundaries.

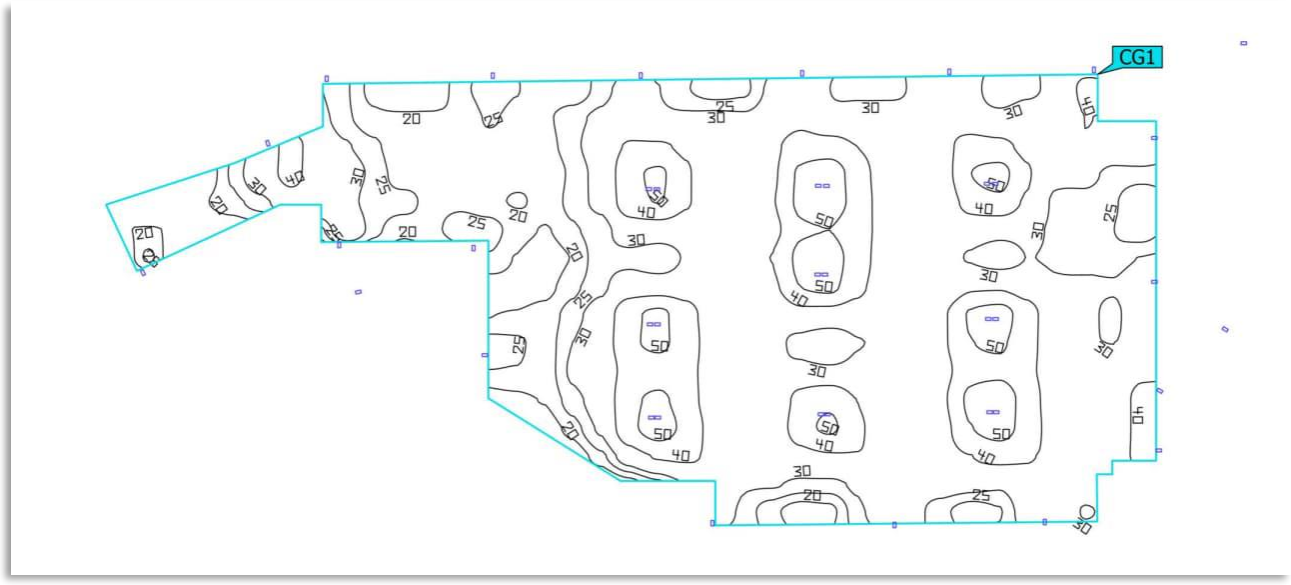

Figure 14 Car Park

Light levels are compliant within the approach to the carpark with the lighting contained within the zone. Peak levels are directly under the light sources, but the overall lighting uniformity is good.

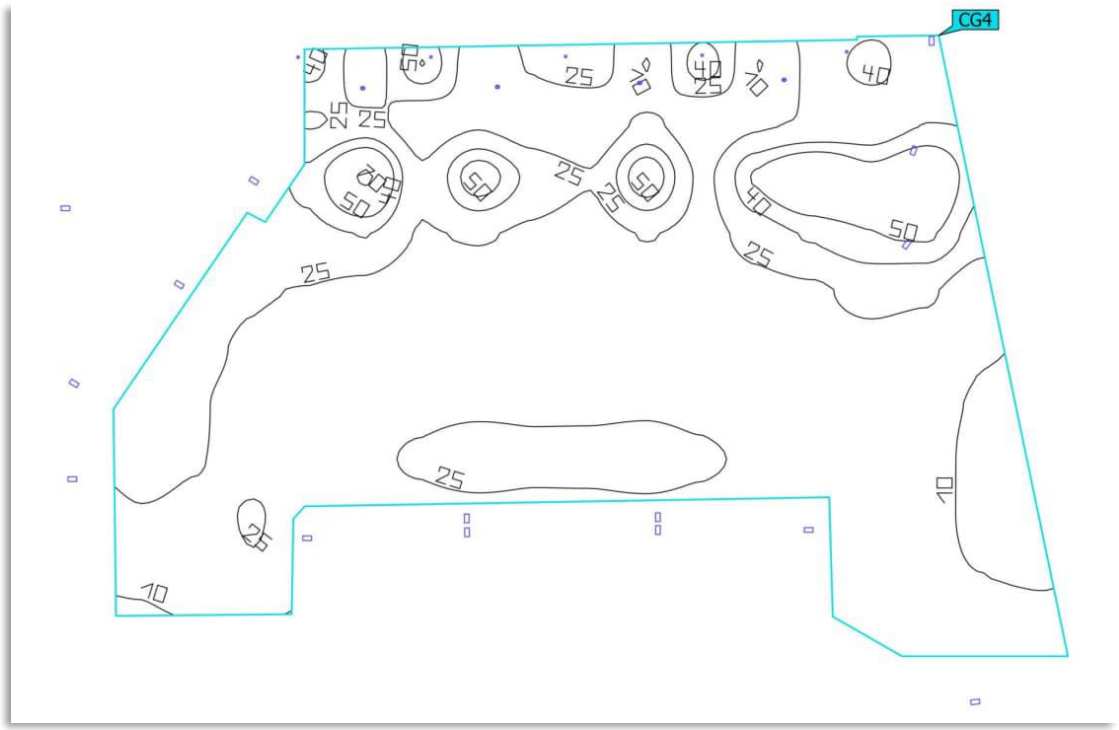

Figure 15 Bus station – Bus parking area. The resulting light levels are functional and provide an appropriate level of illumination for those entering and exiting the building. The exact light levels will be balanced during the final design stage and installation.

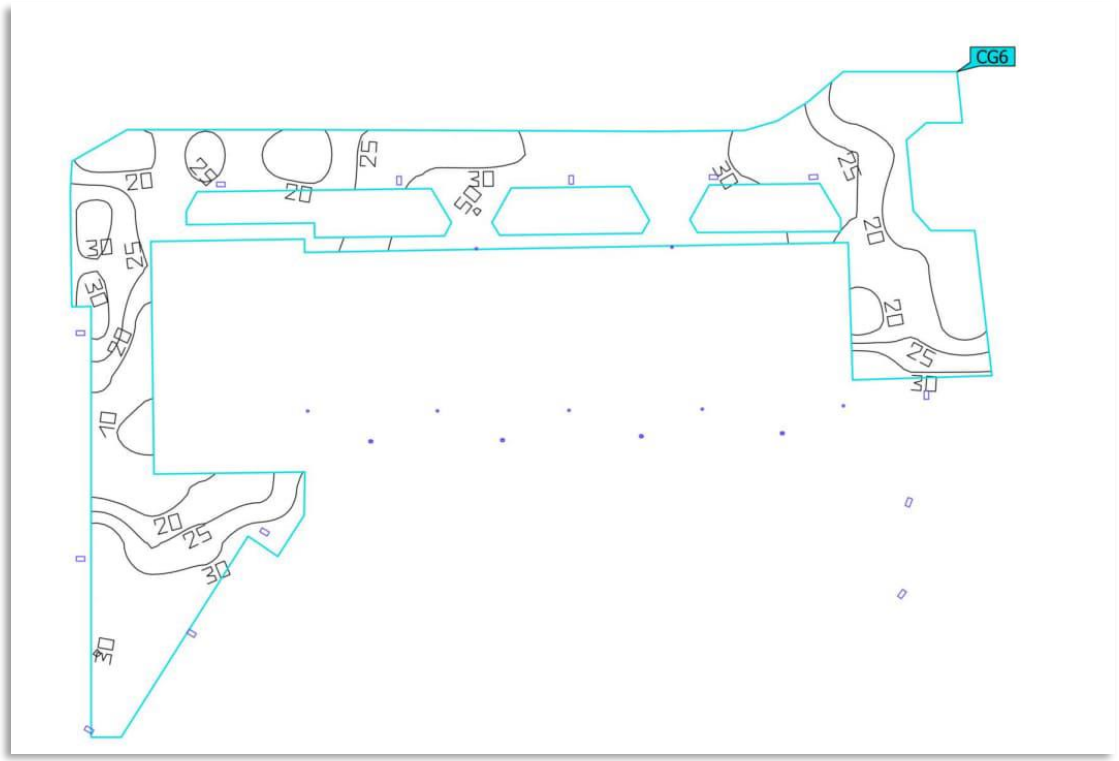

Figure 16 Bus station exterior – main entry.

Appropriate levels of light are provided to ensure the entry / exit points are clear. The lighting will only be fully activated as dusk falls or on gloomy days. Photocells activate the lighting and the lighting is DALI-2 controlled.

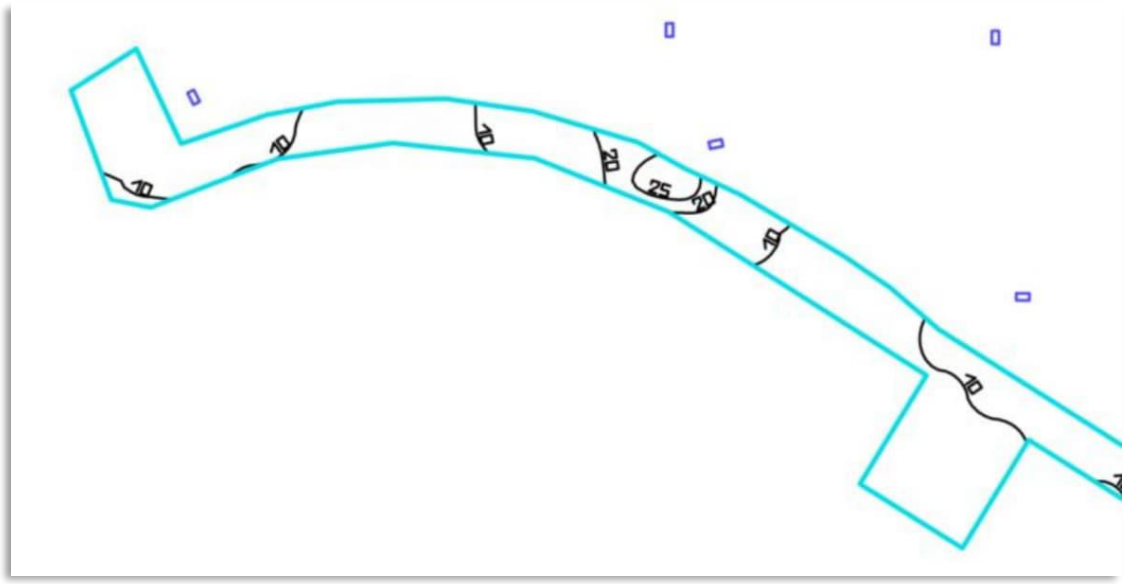

Figure 17 Typical walk-way condition.

Appropriate levels are light are provided to ensure the paths are clear. The lighting will only be fully activated as dusk falls or on gloomy days. Photocells activate the lighting, and the lighting is DALI-2 controlled so levels can reduce after midnight to save energy.

16. Lighting Glare Mitigation

The scheme is inherently glare mitigating as all lighting is aimed to the ground. All lighting optics are designed to be low glare, with no obtrusive lateral spill light, or up-light.

From our site investigations and lighting simulations the lighting is designed to mitigate glare. The only lighting which gets close to residential properties are located at a considerable distance away from their windows. If in the unlikely event there were found to be an adverse reflection or occurrence of light-spill, a back-shield can be added to the proposed fixtures to mitigate stray light. Given the fixtures are highly controlled and site specific we have not found, and do not anticipate any concerns or issues with glare.

17. Lighting within the Bus Station Building

The proposed lighting within the building is integrated within the architecture and is functional. All lighting is LED based and designed area-by area to serve each function. A more detailed description is provided within the Stage 3 lighting and architectural documentation. There is no lighting within the Bus Station building which will either cause undue glare or cause light spill beyond the site boundary. Further there are lighting controls that will dim or extinguish the lighting within the building when not in use. The light levels within the building have been calculated and comply with the new Part L and do not create stray light.

18. Summary

Comprehensive analysis and site investigations have been carried out to identify any potential lighting issues related to the proposed new car park and bus station.

Care and attention have been given to the design to mitigate the risks of adverse sky-spill, glare, light trespass, or annoyance.

The lighting standards and design guidance documents have been followed. The site-specific lighting model demonstrates that the resulting light levels are appropriate and aligned with the brief whilst accounting for UK practices for illumination.

19. Conclusion

This supporting information will provide comfort to the local community, planning authority and residents regarding the proposed bus station, car park and associated lighting. The lighting is a designed to be warm, welcoming, and set to align with the architecture and wider development. The redevelopment of this site will add quality and value to the location and the lighting is aligned to the project values and intent.

Lighting is a focus of scrutiny within the planning process. Through careful and considered lighting, the proposals align with government guidance. The lighting utilises quality LED technologies which are controlled, offer energy savings. The design principles acknowledge that lighting pollution is unwelcome and is mitigated though design.